DOCUMENT RESUME

ED 105 473 CS 201 999

AUTHOR	Dunn, Lloyd M.; And Others
TITLE	Teachers and Group Size as Variables in Stimulating Oral Language Development with Grade One Disadvantaged Children. IMRID, Volume III, No. 1.
INSTITUTION	George Peabody Coll. for Teachers, Nashville, Tenn. Inst. on Mental Retardation and Intellectual Development.
SPONS AGENCY	National Inst. of Child Health and Human Development (NIH), Bethesda, Md.
PUB DATE	66
NOTE	21p.
EDRS PRICE	MF-$0.76 HC-$1.58 PLUS POSTAGE
DESCRIPTORS	Disadvantaged Youth; *Educationally Disadvantaged; *Educational Research; Elementary Education; Group Instruction; Language Arts; *Language Development; Oral Communication; *Oral Expression; *Teaching Conditions

ABSTRACT

The purpose of this study was to evaluate both the relative effectiveness of different instructional personnel and the effect of differences in group size upon oral language acquisition for educationally disadvantaged first grade children. Involved in the treatment program were 23 classes in eight schools, all serving lower class areas of a southern metropolitan city. From these classes, a sample of 290 subjects was drawn, half boys and half girls. All of the children had IQ scores ranging from 60 to 110 on the pretest. Language development over the year was measured by the administration of the Illinois Test of Psycholinguistic Abilities, the Peabody Picture Vocabulary Test, and the Peabody Language Production Inventory. Though small differences in progress were observed among groups receiving their instruction under various conditions, statistical analysis indicated that these differences could not be accounted for by either of the experimental variables. The results suggest that a well designed instructional program can be equally effective under a variety of conditions. (TS)

ED105473

IMRID

INSTITUTE ON MENTAL RETARDATION AND INTELLECTUAL DEVELOPMENT

A Unit of the

John F. Kennedy Center for Research on Education and Human Development
Volume III, No. 1 - 1966

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Teachers and Group Size as Variables in Stimulating Oral Language Development with Grade One Disadvantaged Children[1]

by

Lloyd M. Dunn, Max W. Mueller,[2] and Prayot Pochanart
Institute on Mental Retardation and Intellectual Development
George Peabody College for Teachers
Nashville, Tennessee 37203

Group size and the type of instructional personnel have long been assumed to influence pupil progress. Group size has been a special concern to many educational administrators and researchers over the years. Supervisors as well as classroom teachers have frequently suggested that the smaller the group size, the more the children are likely to learn. This belief has been held especially at the primary grade level. However, educational researchers have had little success in obtaining empirical evidence to support this commonly held belief. Studies have generally indicated little or no relationship between group size and pupil progress. Children in classes of 15 to 20 have shown little or no progress over and above children enrolled in classes of 30 to 35 (Shane & Polychrones, 1960). This may be due to the fact that many factors, such as amount of pupil participation and the knowledge pool within the group, are significantly affected by group size and often not in the same direction. For example, the number of interactions per member decreases, but the amount of information available to the group increases with an enlargement in group size (Thomas & Fink, 1963). This suggests that group size demands further study, but in a specific type of learning situation where the above mentioned factors are known to operate differently, e.g., knowledge acquisition, basic communication skills, etc.

Recently, utilization of instructional personnel has become a major area of interest for educational administrators. There is a general belief that team teaching is more effective than a regular classroom teacher since additional manpower, resources, and skills are available to pupils in a team teaching setting. There is also a belief that an itinerant teacher may be able to stimulate children more than the regular classroom teacher who is with the children every school day, all year long. Furthermore, there is general belief in the usefulness of community volunteers as helpers to the teacher. However, little research is available in the literature to enable an evaluation of these beliefs. Here again, it is plausible that global studies are likely to yield equivocal results.

The present study aimed only to evaluate the relative effectiveness of various instructional personnel in stimulating oral language development with culturally disadvantaged, first grade children. By limiting evaluation of pupil growth to this single significant area of instruction,

CS 201 299

and by using measuring instruments clearly related to the goals of the program, it was hoped that less equivocal results could be obtained.

Purpose

The purpose of this study was to evaluate the relative effectiveness of different instructional personnel, and the effect of differences in group size upon oral language acquisition for educationally disadvantaged, first grade children. The variables investigated were: (1) size of instructional group (total class of 30-36 versus half the class or 15 to 18), and (2) various instructional personnel (namely regular classroom teacher, team teachers, itinerant teacher, and regular classroom teacher with community volunteer helpers).

Background

This study grew out of a large scale project in which an experimental version of Level #1 of the Peabody Language Development Kit (PLDK) was being evaluated in terms of its effectiveness in enhancing the academic, linguistic and intellectual development of culturally disadvantaged, first grade children (Dunn & Mueller, 1966). This kit consisted of: (1) a manual detailing 200 daily lesson plans, (2) 360 6 x 9 inch picture cards, (3) a supply of individual pupil's color cards, (4) two large story making pictures, and (5) a hand puppet. Not included but necessary for the presentation of the lessons was a tape recorder and a supply of tapes.

The PLDK is designed to stimulate both oral language and verbal intelligence and therefore to enhance school progress. Figure 1 outlines a model of the psycholinguistic processes trained by the lessons.

The lessons are designed to provide a balanced program to stimulate overall oral language development rather than specific aspects of linguistic functioning. Therefore, each lesson contained two to four activities drawing from 23 different categories so that each aspect was equally emphasized. Typical categories included; brainstorming, classifying, conversing, critical thinking, describing, dramatizing, imagining, listening, memorizing, patterning, rhyming, seeing relationships, telling stories and vocabulary building. The lessons were designed for children functioning intellectually in the 4 1/2 to 6 1/2 year range. The philosophy of the PLDK is that Language Time should be an interlude from conventional school work in a less structural setting where oral expression on the part of the pupils is optimally encouraged. The children are never called upon either to read or write. The children participate together in a game-like setting with minimal teacher participation in activities which emphasize talking and thinking.

Details on the research and development of early forms of the PLDK are contained in the manual to the experimental edition (Dunn & Smith,

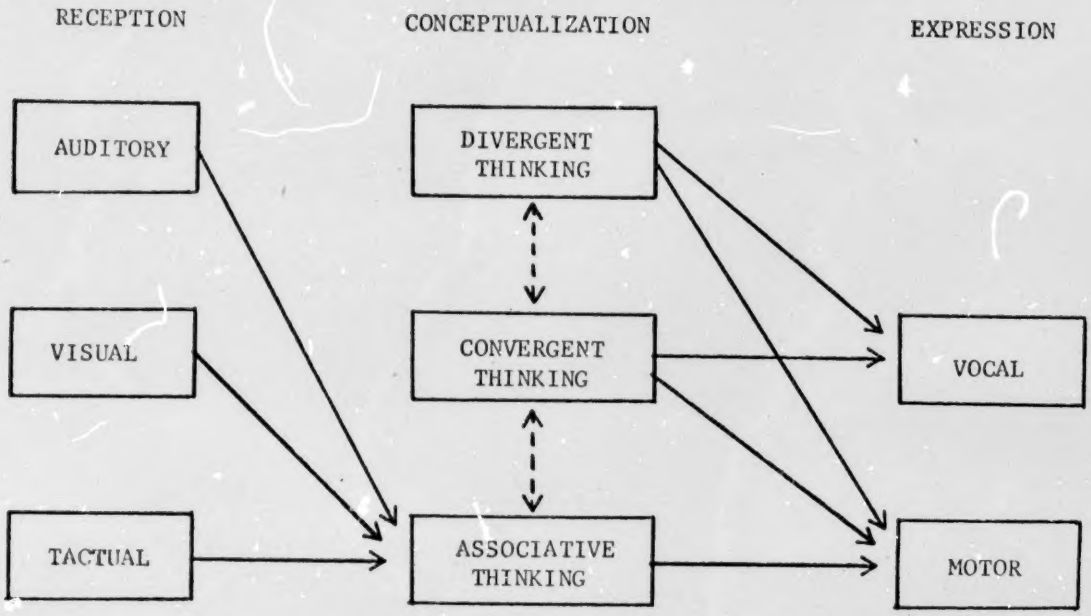

Fig. 1. Model of the psycholinguistic processes trained by the lessons in the Peabody Language Development Kits.

1965). Not reported are the results, after one year, of the use of the PLDK alone, and in combination with the Initial Teaching Alphabet (ITA) approach to beginning reading with first grade disadvantaged children. Details on the findings (of which this article is a part) may be found in a monograph by Dunn and Mueller (1966). When the lessons were taught to the total classroom of pupils by the regular teacher alone, the following resulted: (1) in intellectual development, as measured by IQ changes on the 1960 Stanford-Binet, children receiving PLDK plus ITA (9.24 IQ points gain) made significantly greater progress than pupils on PLDK alone (5.80 IQ points gain), ITA alone (4.34 IQ points gain), or controls (6.00 IQ points gain). In language development, as measured by the Illinois Test of Psycholinguistic Abilities, those in PLDK only gained in language age 14.80 months, as contrasted with a PLDK plus ITA gain of 11.98 months, an ITA only gain of 11.07 months, and a control group gain of 9.09 months. In school achievement as measured by the Metropolitan Achievement Test after 7 1/2 months in school, the PLDK daily lessons did

not enhance achievement in reading or arithmetic when boys and girls were pooled together, but the lessons were significantly more effective for boys than girls in stimulating reading skills.

In general, the research to date on language and intellectual stimulation by the PLDK lessons can be reviewed as heartening first steps. However, much more study is needed on the conditions which best stimulated first grade pupils. If education is to advance as a science, evidence on the instructor and group size variables is needed. This report provides additional evidence concerning these facets of the educative process.

Subjects

Involved in the treatment program were 23 classes in eight schools; all serving lower class areas of a Southern metropolitan city. From these classes a sample of 290 subjects was drawn from a possible pool of approximately 700. Basic information and test scores for the total sample and for each group are presented in Table 1.

Children in each of the classes were excluded if their IQ scores on the pretest were not within the range of 60 to 110. Children whose chronological ages were above 7 years, 6 months at the time of pretesting were also excluded. The various treatment groups were then reduced by random deletion of subjects to the point where numbers in each treatment classification were proportional or equal to the number in the smallest group which was 15. No attention was given to sex or to race. However, approximately one-half of the group was of each sex. Of the eight schools involved in the experiment, all but one served solely Negro children. The single integrated school provided instructional groups classified as regular class and regular group.

It is apparent from an examination of the data in Table 1 that children included in this investigation were as a group, well below normal expectancies in terms of intelligence and language development. At the outset of the experiment, the mean IQ on the 1960 Stanford-Binet of the group was 83.4 and the mean mental age was 5 years, 4 months. The mean language age on the Illinois Test of Psycholinguistic Abilities was 5 years, 1 month. Simple analyses of variance were run on chronological age, IQ, MA, and LA. In no case was a significant difference found among the instructional groups.

Treatments

Instructional personnel taking part in the project were provided with a PLDK and a tape recorder for use in connection with the program. In addition they were provided with a small supplementary stipend and were asked to attend in-service training sessions (approximately once every three weeks) throughout the year. As the year progressed the

Table 1

Basic Information on Selected Samples of First Grade Disadvantaged Children by Groups

Group	Classes	Subjects	Mean CA*	S-B Means IQ	S-B Means MA*	PPVT Mean MA*	ITPA Mean LA*
Total	23	290	75.59	83.40	64.10	55.34	61.37
Regular - Class	4	50	77.46	84.22	66.38	56.06	62.14
Regular - Group	5	50	75.80	84.46	64.94	59.28	62.58
Team - Class	4	50	75.60	82.34	63.28	51.70	60.48
Team - Group	4	50	74.84	83.36	63.48	54.30	60.96
Itinerant - Class	1	15	74.47	84.20	63.67	57.07	60.80
Itinerant - Group	1	15	73.13	90.13	66.33	60.00	62.60
Volunteer - Class	2	30	75.03	80.70	61.77	54.43	59.43
Volunteer - Group	2	30	75.70	81.07	62.77	53.10	61.83

*Reported in months

emphasis of these sessions shifted from learning the experimental treatment to discussions of problems arising in connection with the program.

Administrative Organization

Two dimensions, instructional group size and personnel, were evaluated in connection with the language development project. Group size was suggested as a possibly important variable because it was felt that the PLDK with its emphasis on group participation might be most effective with a relatively small group. This view was supported by the excellent results obtained by Smith (1962) with a similar program working with groups of eight children. To investigate this factor the experimental classes were randomly assigned to one of two conditions: (1) the total class was taught as a unit, and (2) the class was divided into two groups of approximately equal size but with the brighter, linguistically superior children in the first group and slower children in the second. These organized plans were identified as: (1) class treatment and (2) group treatment. Those teachers assigned to group treatment were asked to present the language lessons to the brighter group first each day on the basis of an assumption that the slower children would be more productive having heard the responses of the faster group, even though they would be engaged at other activities (seatwork) during the course of the first presentation.

The second organizational consideration was concerned with the instructional personnel involved in presentation of the PLDK lessons. Again, the possibility of this being a critical variable was indicated by the Smith study (1962). He suggested that the effectiveness of his treatment program might have been partially a result of the influence of an ancillary person working with the children. Teaching situations utilized in this investigation were: (1) regular teacher (PLDK taught by the regular classroom teacher); (2) itinerant teacher (PLDK taught by an itinerant teacher coming into the classroom for the daily lesson); (3) team teachers (PLDK taught by the regular teacher and an itinerant teacher working as a team); (4) volunteer (PLDK taught by the regular teacher with the assistance of a helper who was an educated, community volunteer but did not have a teaching background).

Consideration of these organizational variables resulted in the establishment of eight experimental groups.

(1) Regular-Class	(5) Visiting-Class
(2) Regular-Group	(6) Visiting-Group
(3) Team-Class	(7) Volunteer-Class
(4) Team-Group	(8) Volunteer-Group

The instructors were asked to teach their daily lesson in 35 to 45 minutes to the total class. Those teaching first the fast and then the slow group in two sections were asked to restrict their time to 25 to 30 minutes per group per lesson. Thus, in the class treatment daily

instructional time was 35 to 45 minutes while in the group treatment it was 50 to 60 minutes.

Evaluation

Basic socio-economic information was gathered on all subjects in connection with identifying them as culturally disadvantaged. In addition, test data were obtained on academic achievement at the end of the school year, and on language development and verbal intelligence at the beginning and the end of the year.

Language Development

Three measures of language ability were obtained on the children: the Illinois Test of Psycholinguistic Abilities, the Peabody Picture Vocabulary Test, and the Peabody Language Production Inventory.

The Illinois Test of Psycholinguistic Abilities (McCarthy and Kirk, 1963) was developed as an individual test of the psycholinguistic abilities of children between the ages of 2-1/2 and 9 years. It consists of nine subtests which measure two input channels (auditory and visual), two output channels (vocal and motor), and two levels of organization (representational and automatic-sequential). The nine subtests are: (1) auditory decoding, (2) visual decoding, (3) auditory-vocal association, (4) visual-motor association, (5) vocal encoding, (6) motor encoding, (7) auditory-vocal automatic, (8) auditory-vocal sequencing, and (9) visual-motor sequencing.

The Peabody Picture Vocabulary Test (Dunn, 1965) is an individually administered, single channel, instrument yielding a measure of hearing vocabulary. The subject is required to indicate which of four response pictures correctly depicts the meaning of a stimulus word presented orally by the examiner. There are 150 items in the test, graded in difficulty from the 2 to the 18 year level. It is only necessary to administer the test over the critical range for an individual subject; thus the test takes only about 10 minutes to administer and score.

The Peabody Language Production Inventory (PLPI) is an unstandardized instrument developed expressly for use in this study. It is designed to measure the free speech of children through showing them a series of three pictures (a street scene, a good humor man scene, and an operating room scene), and asking the Ss to tell a different story about each. The responses of the subjects are rated on three dimensions of performance: (a) level of abstraction (integrative story, description of action, description of content, enumeration of content), (b) structural complexity (use of paragraphs, sentences, phrases or words only), and (c) general (speech volume, speech quality, and attitude toward the test).

Verbal Intelligence

The verbal intelligence of the children was measured by means of the 1960 revision of the Stanford-Binet. It was selected instead of such other individual intelligence tests as the Weschler Intelligence Scale for Children in that it has been demonstrated to be effective at the age and level of operation of the subjects used in the present study.

Academic Achievement

Since the Metropolitan Achievement Test is used throughout the Nashville Metropolitan Schools and is administered routinely at the end of each school year by the classroom teachers, it was the instrument of choice for measuring academic achievement. The Primary Battery 1 was used. It consists of four subtests: word knowledge (WK), word discrimination (WD), reading (R), and arithmetic (A). The achievement testing took place from late March to mid-May. Actual grade placement at the time of test averaged about 1.80.

Results

Data on linguistic, intellectual, and academic performance were analyzed to determine whether there existed differences which could be attributed to the various organizational plans used in teaching the PLDK. Test results from the various measures of linguistic functioning are reported in Table 2 for the total sample and for each treatment group. Results on tests of intelligence and achievement are presented in Tables 3 and 4 in the same manner. Results of analysis of variance of language scores are presented in Table 5. Results of these analyses suggest that the effectiveness of the PLDK program in enhancing language ability is largely independent of the various administrative procedures under consideration. No significant differences were observed among the various groups on scores from the PPVT or PLPI. Main effects differences were also negligible on ITPA scores though a significant interaction between class size and teaching organization was observed. This was accounted for by the fact that instruction to small groups by teachers working with community volunteers resulted in smaller gains than when the same personnel worked with total classes. Team teaching proved less effective with the full class taught as one group. Under the regular teacher and itinerant teacher plan, class size resulted in no difference. These findings are depicted graphically in Figure 2.

Results of analyses carried out on intelligence data from the Stanford-Binet Individual Intelligence Scale are reported in Table 6. On the basis of these analyses it is clear that gains in the area of intellectual functioning are not effected by the various administrative procedures under study.

Table 2a

Means and Standard Deviations of Pre, Post and Gain Scores on Measures of Language

Group		ITPA LA*			PPVT MA*			PLPI
		Pre	Post	Gain	Pre	Post	Gain	Post
Total	$\bar{X}$	61.37	74.57	13.20	55.34	69.34	14.00	62.94
	SD	8.30	11.49		15.06	14.58		12.26
Regular - Class	$\bar{X}$	62.14	77.34	15.20	56.06	66.78	10.72	64.20
	SD	9.16	13.22		17.39	14.61		10.77
Regular - Group	$\bar{X}$	62.58	75.72	13.14	59.28	74.50	15.22	61.30
	SD	8.08	10.77		13.98	13.69		11.69
Team - Class	$\bar{X}$	60.48	71.70	11.22	51.70	68.98	17.28	62.24
	SD	8.64	8.98		12.23	15.47		13.74
Team - Group	$\bar{X}$	60.96	75.50	14.54	54.30	69.32	15.02	65.12
	SD	9.09	13.02		16.64	15.48		13.02
Itinerant - Class	$\bar{X}$	60.80	74.07	13.27	57.07	69.27	12.20	60.87
	SD	6.07	7.72		12.01	10.92		11.07
Itinerant - Group	$\bar{X}$	62.60	75.47	12.87	60.00	69.87	9.87	68.47
	SD	5.95	10.95		10.01	9.93		12.69
Volunteer - Class	$\bar{X}$	59.43	73.20	13.77	54.43	67.37	12.94	58.47
	SD	8.18	12.85		16.05	14.69		13.09
Volunteer - Group	$\bar{X}$	61.83	72.43	10.60	53.10	67.40	14.30	63.83
	SD	7.49	10.53		15.88	15.68		10.04

*Reported in months

Table 2b

Means and Standard Deviations of Pre, Post and Gain Scores on Measures of Language

		ITPA LA*			PPVT MA*			PLPI
		Pre	Post	Gain	Pre	Post	Gain	Post
Class	$\bar{X}$	60.87	74.20	13.33	54.33	67.92	13.59	61.99
	SD	8.49	11.48		14.97	14.50		12.43
Group	$\bar{X}$	61.87	74.94	13.07	56.36	70.77	14.41	63.88
	SD	9.28	11.52		15.14	14.57		12.05
Regular	$\bar{X}$	62.36	76.53	14.17	57.67	70.64	12.97	62.75
	SD	8.59	12.02		15.78	14.61		11.28
Team Teaching	$\bar{X}$	60.72	73.60	12.88	53.00	69.15	16.15	63.68
	SD	8.83	11.29		14.59	15.40		13.40
Itinerant	$\bar{X}$	61.70	74.77	13.07	58.53	69.56	11.03	64.67
	SD	5.98	9.34		10.96	10.26		12.31
Volunteer	$\bar{X}$	60.63	72.82	12.19	53.76	67.38	13.62	61.15
	SD	7.87	11.65		15.84	15.06		11.88

*Reported in months

Table 3

Means and Standard Deviations of Pre, Post and Gain Scores on Stanford-Binet Intelligence Test Data

Group		IQ			MA*		
		Pre	Post	Gain	Pre	Post	Gain
Total	$\bar{X}$	83.40	91.44	8.04	64.10	77.40	13.30
	SD	10.78	12.35		7.51	9.14	
Regular - Class	$\bar{X}$	84.22	90.38	6.16	66.38	78.62	12.24
	SD	12.72	13.32		9.77	10.51	
Regular - Group	$\bar{X}$	84.46	92.36	7.90	64.94	77.82	12.88
	SD	9.62	12.05		6.24	7.70	
Team - Class	$\bar{X}$	82.34	90.76	8.42	63.28	76.76	13.48
	SD	11.47	11.60		7.48	7.86	
Team - Group	X	83.36	91.60	8.24	63.48	77.18	13.70
	SD	10.36	13.51		7.61	9.93	
Itinerant - Class	$\bar{X}$	84.20	92.47	8.27	63.67	76.73	13.06
	SD	8.47	11.38		5.00	7.04	
Itinerant - Group	$\bar{X}$	90.13	99.73	9.60	66.33	81.40	15.07
	SD	7.94	14.41		4.48	10.29	
Volunteer - Class	$\bar{X}$	80.70	88.97	8.27	61.77	74.70	12.93
	SD	10.08	10.63		7.02	8.49	
Volunteer - Group	$\bar{X}$	81.07	90.33	9.26	62.77	77.13	14.36
	SD	10.76	12.62		7.06	9.95	

* Reported in months

Table 4

Means and Standard Deviations on the Metropolitan Achievement Test Data

Instructional Groups		WK	WD	R	A
Total	$\bar{X}$	1.68	1.68	1.74	1.56
	SD	.48	.51	.48	.58
Regular - Class	$\bar{X}$	1.76	1.83	1.78	1.69
	SD	.43	.60	.48	.60
Regular - Group	$\bar{X}$	1.62	1.68	1.70	1.54
	SD	.23	.34	.26	.42
Team Teaching - Class	$\bar{X}$	1.72	1.79	1.78	1.74
	SD	.46	.56	.49	.65
Team Teaching - Group	$\bar{X}$	1.62	1.64	1.64	1.52
	SD	.41	.55	.35	.67
Itinerant - Class	$\bar{X}$	2.29	1.78	2.40	1.33
	SD	.84	.64	.99	.28
Itinerant - Group	$\bar{X}$	1.72	1.68	1.73	1.93
	SD	.54	.58	.50	.73
Volunteer - Class	$\bar{X}$	1.49	1.45	1.61	1.38
	SD	.25	.24	.30	.43
Volunteer - Group	$\bar{X}$	1.50	1.46	1.60	1.22
	SD	.42	.41	.41	.30
Class	$\bar{X}$	1.75	1.73	1.81	1.61
	SD	.53	.55	.56	.58
Group	$\bar{X}$	1.61	1.62	1.66	1.51
	SD	.43	.46	.35	.57
Regular	$\bar{X}$	1.69	1.75	1.74	1.62
	SD	.43	.49	.39	.53
Team Teaching	$\bar{X}$	1.67	1.72	1.71	1.63
	SD	.44	.56	.43	.67
Itinerant	$\bar{X}$	2.00	1.73	2.07	1.63
	SD	.75	.60	.84	.62
Volunteer	$\bar{X}$	1.50	1.46	1.60	1.30
	SD	.34	.34	.36	.38

Table 5

Analysis of Variance on the Language Data

Source of Variation	Degree of Freedom	Sum of Squares	Mean Squares	F Ratio	Confidence Levels
A. LA Gains as measured by the ITPA					
A (group vs. class)	1	4.979	4.979	.074	
B (teacher)	3	166.880	55.627	.829	
AB Interaction	3	528.287	176.096	2.624	$F_{.95}=2.63$
Error	282	18926.253	67.114		
Total	289	19626.400			
B. MA Gains as measured by the PPVT					
A (group vs. class)	1	48.014	48.014	.310	
B (teacher)	3	841.190	280.397	1.809	
AB Interaction	3	654.776	218.259	1.408	
Error	282	43706.020	154.986		
Total	289	45250.000			
C. Posttest raw scores on the PLPI					
A (group vs. class)	1	258.883	258.883	1.746	
B (teacher)	3	340.056	113.352	.765	
AB Interaction	3	1023.944	341.315	2.302	
Error	282	41806.000	148.248		
Total	289	43428.883			

Table 6

Analysis of Variance of IQ and MA Gains as Measured by Stanford-Binet Intelligence Scale

Source of Variation	Degree of Freedom	Sum of Squares	Mean Squares	F Ratio	Confidence Levels
A. Intelligence Quotient					
A (group vs. class)	1	56.496	56.496	.697	$F_{.95}=3.87$
B (teacher)	3	166.035	55.345	.683	$F_{.95}=2.63$
AB interaction	3	48.337	16.112		
Error	282	22846.787	81.017		
Total	289	23117.655			
B. Mental Age					
A (group vs. class)	1	46.400	46.400	1.049	$F_{.95}=3.87$
B (teacher)	3	88.150	29.383	.664	$F_{.95}=2.63$
AB interaction	3	25.867	8.622	.195	
Error	282	12474.080	44.234		
Total	289	12634.497			

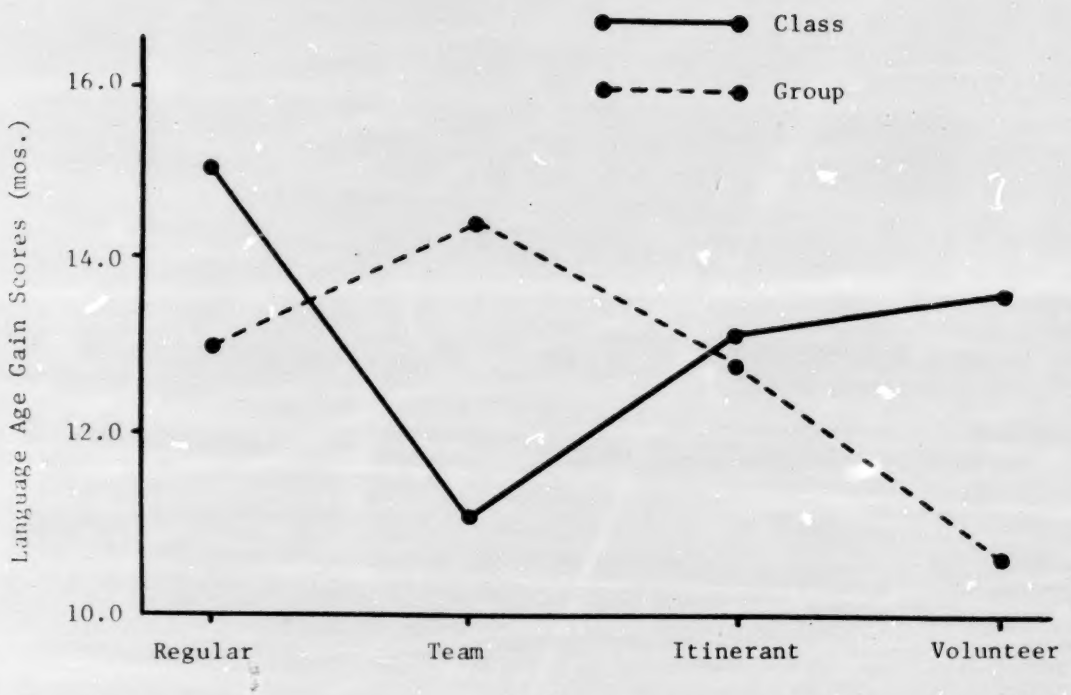

Fig. 2. Graphic presentation of the interaction effects between the class size and instruction variables on the language age gains on the ITPA.

Table 7 presents the results of the analysis of data from the Metropolitan Achievement Test. A significant three way interaction is present which indicates that the interaction between MAT subtest and teacher organization is different for the group treatment than for class treatment. This results from the fact that in the group treatment scores were less effected by teacher organization. A significant first order interaction was observed between teacher organization and subtest scores. This is accounted for primarily by the fact that the patterns of scores of the various subtests were generally similar except for rather extreme variations in the itinerant teacher treatment especially where the itinerant teacher worked with the entire class as a unit. Significant differences were also observed for all main effects. Differences in group size favored the total class as the instructional group. Differences in the performance of various teaching plans indicated that the itinerant teacher plan was most effective and the volunteer program least effective, with regular teacher and team teaching plans being intermediate. Finally, the differences among scores of the various subtests were accounted for primarily by the fact that arithmetic scores were consistently lower than those on word knowledge, word recognition and reading.

Table 7

Analysis of Variance of School Achievement Data as Measured by Metropolitan Achievement Test

Source of Variation	Degree of Freedom	Sum of Squares	Mean Squares	F Ratio	Confidence Levels
A (group vs. class)	1	4.556	4.556	6.340	$F_{.95}=3.87$
B (teacher)	3	14.732	4.556	6.834	$F_{.95}=2.63$
AB interaction	3	.694	.231	.322	
Error (b)	282	202.665	.719		
Total of Variance Between Ss	289	222.647			
C (subtest)	3	4.914	1.638	20.299	$F_{.95}=2.63$
AC interaction	3	.125	.042	.514	
BC interaction	9	3.668	.408	5.050	$F_{.95}=1.91$
ABC interaction	9	7.963	.885	10.964	$F_{.95}=1.91$
Error (w)	846	68.295	.081		
Total of Variance Within Ss	870	84.965			
Total	1159	307.612			

Summary and Conclusions

In this investigation an experimental sample of 290 subjects received language instruction for a period of one school year under several organizational schemes. These included full class (30-35 Ss per class) and group (15-18 Ss per group) instruction by regular teachers, itinerant teachers, and in team teaching situations where the regular teacher was assisted in lesson presentation by either an itinerant teacher or a volunteer aide from the community. Language growth over the year was measured by administration of the Illinois Test of Psycholinguistic Abilities, the Peabody Picture Vocabulary Test, and the Peabody Language Production Inventory at the beginning and at the end of the year. Intellectual development was also measured using pre-treatment and post-treatment administrations of the Stanford-Binet Intelligence Scale. School achievement was evaluated on the basis of scores from the Metropolitan Achievement Test administered near the end of the school year.

Though small differences in progress were observed among groups receiving their instruction under various conditions, statistical analyses indicated that these differences could not be accounted for by either of the experimental variables. No significant main effects were observed in performance on the ITPA, PPVT, PLPI, or Binet. The significant interaction between instructional group size and teaching personnel in the ITPA, which indicates that team teaching works best when the class is divided into two groups, and that the volunteer works best when the class is taught as a whole, is difficult to interpret. The complicated nature of this single significant difference suggests that it may be a spurious finding.

Overall, it appears that neither of the dimensions under study differentially effected growth in intelligence or language development under the PLDK program. It appears that the program is equally effective under a variety of teaching structures. This conclusion is supported by observations made by the experimental teachers regarding the program (see Dunn & Mueller, 1966). The lack of statistically significant differences may, however, be of considerable practical significance. Generalizing, from the results of this investigation, one might suggest that the teacher should feel quite free to use whatever organizational structure is appealing and practical in implementing this language development program. It may well be that flexibility of organization is the essential feature of an optimal program.

Significant differences were observed in the school achievement of the various experimental groups. Achievement of classes taught as a whole was significantly superior to that of classes taught in small groups. Since associated research (Dunn & Mueller, in press) has indicated that the PLDK program does not effect academic performance to nearly the extent that it effects language performance, it may seem inconsistent that differential effects of different structures for

teaching this same program were observed for achievement scores rather than language. The most reasonable explanation is that the time devoted to language development as a small group activity seriously restricted the amount of time that could be devoted to basic academic subjects. Thus, higher achievement was observed under the full class organization.

The results of this investigation lend no support to the assumptions mentioned at the outset of the article concerning the advantage of small class size or ancillary personnel. While this does not necessarily indicate that these variables are insignificant in all situations, it does suggest strongly that a well designed instructional program can be equally effective under a variety of conditions.

References

Dunn, L. M. Expanded manual for the Peabody Picture Vocabulary Test. Minneapolis, Minn.: American Guidance Service, Inc., 1965

Dunn, L. M., & Mueller, M. W. The effectiveness of the Initial Teaching Alphabet and the Peabody Language Development Kit with grade 1 disadvantaged children. IMRID Monograph No. 2, Peabody College, Nashville, Tenn.: 1966.

Dunn, L. M., & Smith, J. O. (Eds.). Peabody Language Development Kit: Level #1. Minneapolis, Minn.: American Guidance Service, Inc., 1965.

McCarthy, J. J., & Kirk, S. A. The construction, standardization, and statistical characteristics of the Illinois Test of Psycholinguistic Abilities. Madison, Wisc.: Photo-Press, Inc., 1963.

Shane, H. G., & Polychrones, J. Z. Elementary education organization and administration. In Encyclopedia of educational research. New York: Macmillan Company, 1960.

Smith, J. O. Effects of a group language development program upon the psycholinguistic abilities of educable mental retardates. Peabody College Special Education Research Monograph Series No. 1, 1962.

Thomas, E. J., & Fink, C. F. Effects of group size. Psychological Bulletin, 1963, 60, 381-384.

Footnotes

[1]The research reported herein was supported by grant HD-973 from the National Institute of Child Health and Human Development, and from Ford Foundation funds through the Nashville Education Improvement Project. This experiment was carried out in collaboration with the Nashville Metropolitan Schools. Recognition is due to many teachers and administrators who assisted in this research, particularly M. D. Neely and Carrie Denney who coordinated the program in the school system.

[2]Dr. Mueller is now Research Coordinator, Handicapped Children & Youth Branch, U. S. Office of Education, Washington, D. C.